

**Final
Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan, and Site-Specific
Unexploded Ordnance Safety Plan Attachments
Site Investigation at Range 25, Known Distance Range,
Parcel 83Q and Impact Area, Parcel 118Q-X**

**Fort McClellan
Calhoun County, Alabama**

**Task Order CK11
Contract No. DACA21-96-D-0018
IT Project No. 800486**

August 2001

Revision 0

**Final
Site-Specific Field Sampling Plan Attachment
Site Investigation at Range 25, Known Distance Range,
Parcel 83Q and Impact Area, Parcel 118Q-X**

**Fort McClellan
Calhoun County, Alabama**

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Table of Contents

	<i>Page</i>
List of Tables	iii
List of Figures	iii
List of Acronyms	iv
Executive Summary	ES-1
1.0 Project Description	1-1
1.1 Introduction	1-1
1.2 Site Description	1-1
1.3 Scope of Work	1-4
2.0 Summary of Existing Environmental Studies	2-1
3.0 Site-Specific Data Quality Objectives	3-1
3.1 Overview	3-1
3.2 Data Users and Available Data	3-1
3.3 Conceptual Site Exposure Model	3-2
3.4 Decision-Making Process, Data Uses, and Needs	3-3
3.4.1 Risk Evaluation	3-3
3.4.2 Data Types and Quality	3-4
3.4.3 Precision, Accuracy, and Completeness	3-4
4.0 Field Activities	4-1
4.1 UXO Survey Requirements and Utility Clearances	4-1
4.1.1 Surface UXO Survey	4-1
4.1.2 Downhole UXO Survey	4-1
4.1.3 Utility Clearances	4-1
4.2 Environmental Sampling	4-2
4.2.1 Surface Soil Sampling	4-2
4.2.1.1 Sample Locations and Rationale	4-2
4.2.1.2 Sample Collection	4-2
4.2.2 Subsurface Soil Sampling	4-3
4.2.2.1 Sample Locations and Rationale	4-3
4.2.2.2 Sample Collection	4-3
4.2.3 Permanent Residuum Monitoring Wells	4-4
4.2.4 Permanent Bedrock Monitoring Well	4-4

Table of Contents (Continued)

	Page
4.2.5 Groundwater Sampling	4-5
4.2.4.1 Sample Locations and Rationale	4-6
4.2.4.2 Sample Collection	4-6
4.2.5 Surface Water Sampling	4-6
4.2.5.1 Sample Locations and Rationale	4-6
4.2.5.2 Sample Collection	4-6
4.2.6 Sediment Sampling	4-7
4.2.6.1 Sample Locations and Rationale	4-7
4.2.6.2 Sample Collection	4-7
4.3 Decontamination Requirements	4-7
4.4 Surveying of Sample Locations.....	4-7
4.5 Analytical Program.....	4-8
4.6 Sample Preservation, Packaging, and Shipping	4-9
4.7 Investigation-Derived Waste Management	4-9
4.8 Site-Specific Safety and Health.....	4-9
5.0 Project Schedule.....	5-1
6.0 References	6-1

List of Tables

Number	Title	Follows Page
3-1	Summary of Data Quality Objectives	3-1
4-1	Sampling Locations and Rationale	4-2
4-2	Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities	4-2
4-3	Groundwater Sample Designations and QA/QC Sample Quantities	4-6
4-4	Surface Water and Sediment Sample Designations and QA/QC Sample Quantities	4-6
4-5	Analytical Samples	4-8

List of Figures

Number	Title	Follows Page
1-1	Site Location Map, Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X	1-1
1-2	Range Fan Map, Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X	1-1
1-3	Site Map, Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X	1-1
3-1	Human Health Conceptual Site Exposure Model	3-3
4-1	Proposed Sample Locations, Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X	4-2

List of Acronyms

See Attachment 1, List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, at Fort McClellan (FTMC), Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X.

Range 25 is located on Central Main Post. Weapons fired at this range include various small arms, e.g., M-14 (7.62 millimeter [mm]), M-16 (5.56mm), M-1 (.30 caliber), and M-60 (7.62mm) with tracers (white phosphorus). Range 25 is one of the oldest ranges at FTMC and is first recorded on a map dated 1937. Long-time FTMC personnel believe that Range 25 was constructed as a 600-yard known distance range for training using M-1903 Springfield (.30 caliber) and M-1 Garand rifles (.30 caliber). They report that this range was also used as a machine gun range. Records maintained at FTMC Range Control indicate that the range was used for M-14 training. Previous records are unavailable. Day-and-night-phase firing was practiced here.

Numerous mortar rounds were observed by Environmental Science and Engineering, Inc. (ESE) personnel on the ground surface in an impact area behind (north) the Range 25 berm (Parcel 118Q-X). Ordnance items, including mortar and artillery rounds, are sometimes encountered after heavy rains. Numerous 3-inch mortar rounds were observed behind the backstop at this range during the site visit by ESE personnel preparing the environmental baseline survey. Personnel of the 142nd Explosive Ordnance Disposal accompanied ESE personnel to this site and report that these 3-inch mortar rounds appeared to be sand-filled or otherwise inert. Practice rounds were sometimes filled with sand.

Specifically, IT will collect 53 surface soil samples, 53 subsurface soil samples, 6 groundwater samples, 10 surface water samples, and 10 sediment samples at this site. Potential contaminant sources at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, are primarily unknown but may include nitroexplosives and lead. Chemical analyses of the samples collected during the field program will include metals and nitroexplosives for all samples, with 20 percent of the samples to be analyzed for volatiles, semivolatiles, pesticides and herbicides.

In addition, sediment samples will be analyzed for total organic carbon and grain size. Results from these analyses will be compared to site-specific screening levels and ecological screening values presented in the IT July 2000 *Final Human Health and Ecological Screening Values and PAH Background Summary Report* and regulatory agency guidelines.

Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, fall within the “Possible Artillery Impact Areas” shown on Plate 10 of the U.S. Army Corps of Engineers July 1999 *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama*. Therefore, unexploded ordnance (UXO) surface sweeps and downhole surveys of soil borings will be required to support field activities at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) for Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

1.0 Project Description

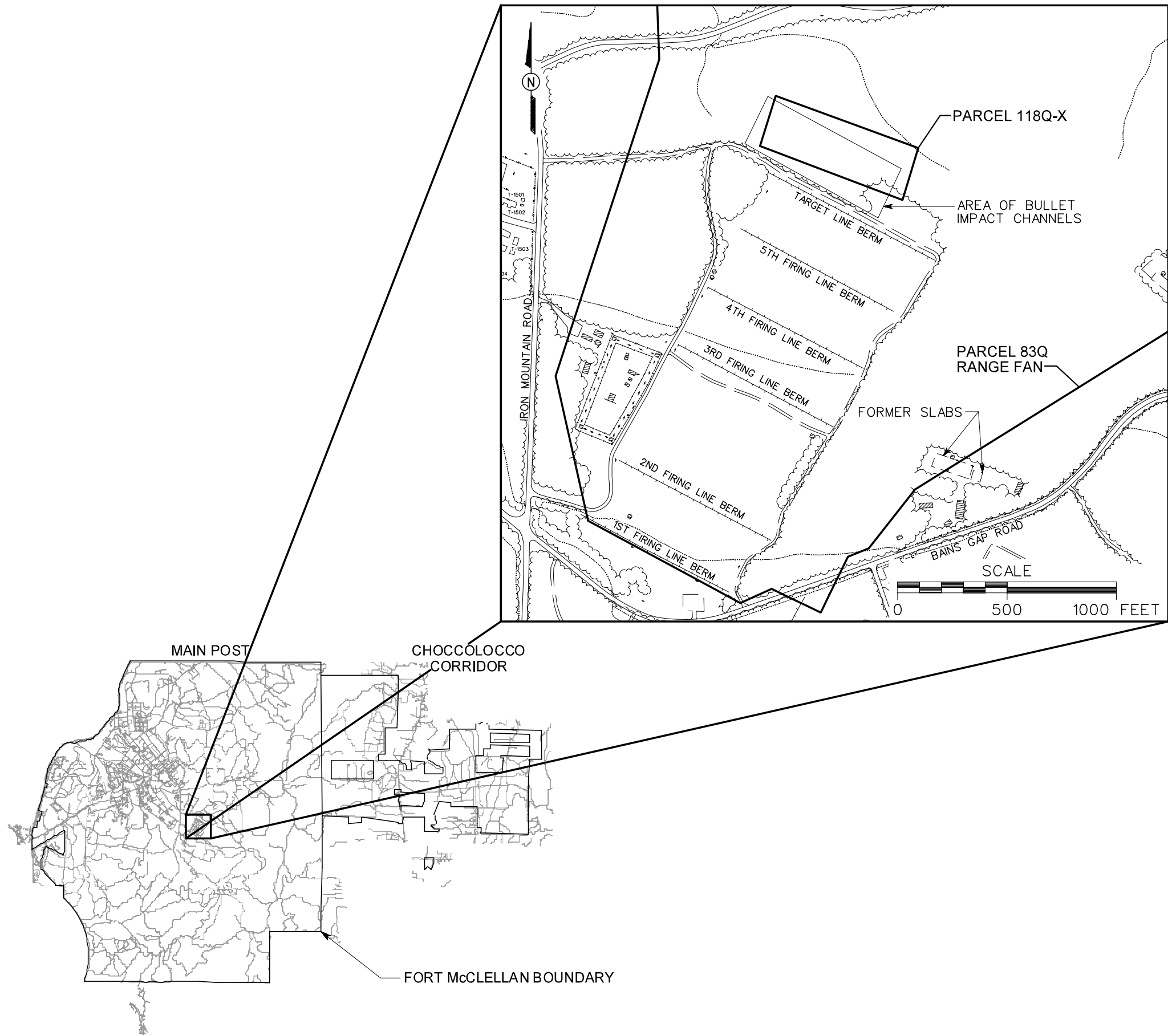
1.1 Introduction

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, under Task Order CK10, Contract Number DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) for FTMC (IT, 2000a) has been prepared to provide technical guidance for sample collection and analysis at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and the site-specific unexploded ordnance (UXO) safety plan developed for Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, and the installation-wide work plan (WP) (IT, 1998) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

1.2 Site Description

Range 25 is located on Central Main Post (Figures 1-1, 1-2, and 1-3). Weapons fired at this range included various small arms, e.g., M-14 (7.62 millimeter [mm]), M-16 (5.56mm), M-1 (.30 caliber), and M-60 (7.62mm) with tracers (white phosphorus). The firing direction was to the northeast along the length of Range 25. There are five firing line berms where soldiers fired toward the target berm at the northeast end of the range (Figure 1-3). Bullet impact channels are present north of the target berm in the area of Parcel 118-Q-X. Range 25 is one of the oldest ranges at FTMC and is first recorded on a map dated 1937 (Environmental Science and Engineering [ESE], 1998). Long-time FTMC personnel believe that Range 25 was constructed as a 600-yard known distance range for training using M-1903 Springfield (.30 caliber) and M-1 Garand rifles (.30 caliber). They report that this range was also used as a machine gun range. Records maintained at FTMC Range Control indicate that the range was used for M-14 training (ESE, 1998). Previous records are unavailable. Day-and-night-phase firing was practiced here (ESE, 1998).

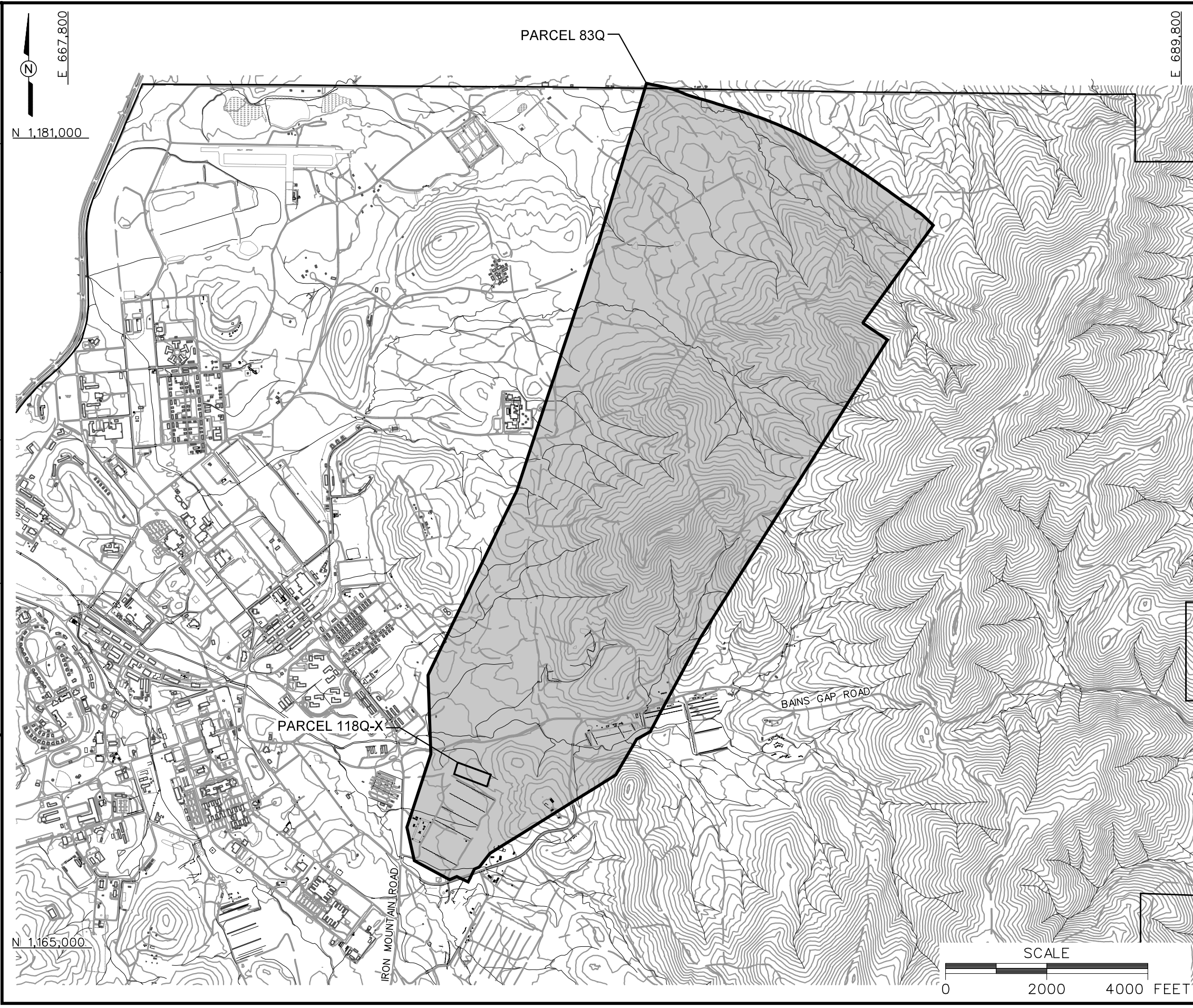


LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- BERM

FIGURE 1-1
SITE LOCATION MAP
RANGE 25, KNOWN DISTANCE RANGE
PARCEL 83Q AND IMPACT AREA
PARCEL 118Q-X

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018



LEGEND

PAVED ROADS AND PARKING

BUILDING

TOPOGRAPHIC CONTOURS
(CONTOUR INTERVAL - 25 FOOT)

PARCEL BOUNDARY

SURFACE DRAINAGE / CREEK

FIGURE 1-2

SITE MAP

RANGE 25, KNOWN DISTANCE RANGE

PARCEL 83Q AND IMPACT AREA

PARCEL 118Q-X

U. S. ARMY CORPS OF ENGINEERS

MOBILE DISTRICT

FORT McCLELLAN

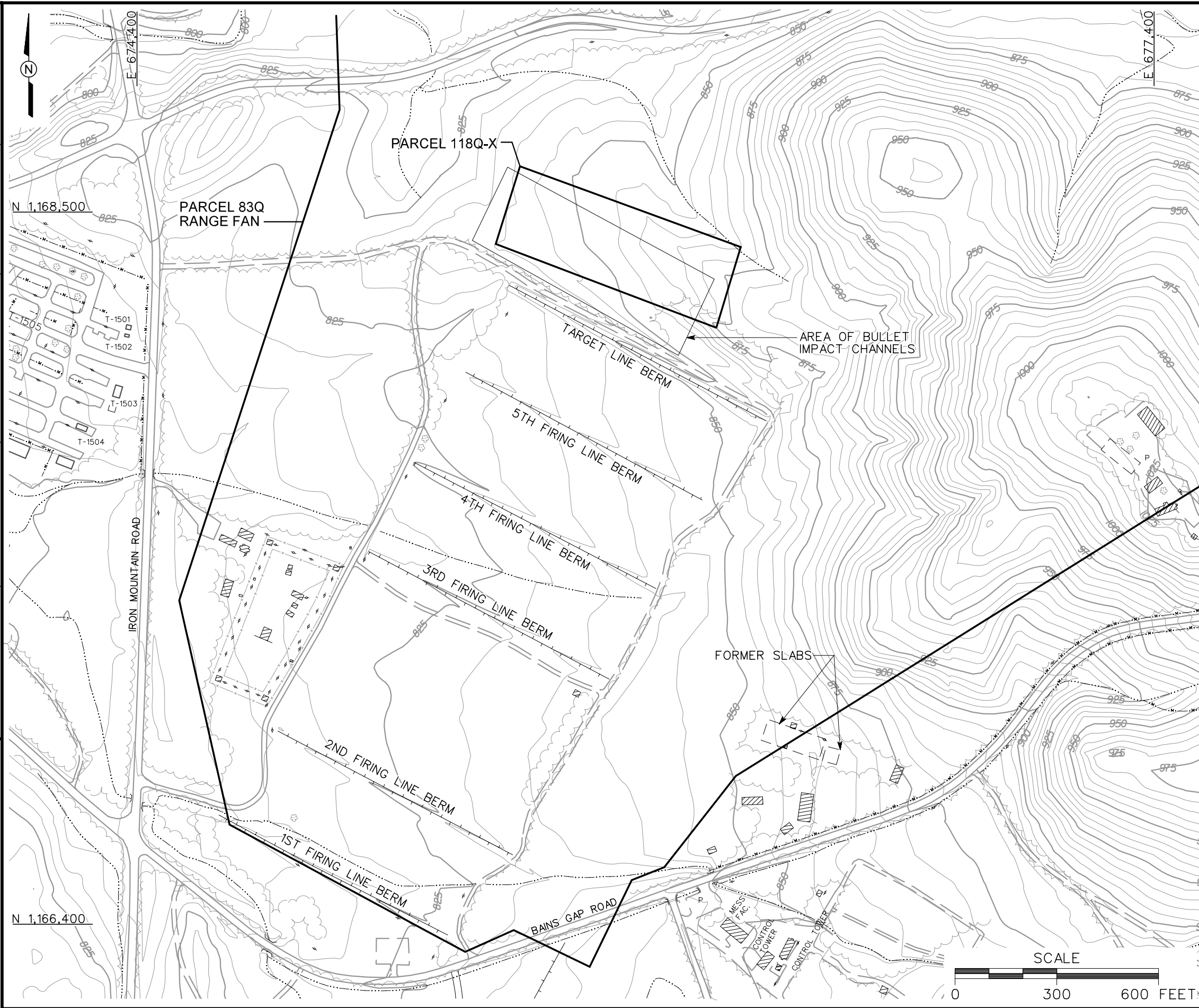
CALHOUN COUNTY, ALABAMA

Contract No. DACA21-96-D-0018

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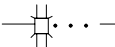
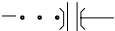




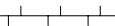
- ## LEGEND
- | | |
|---|---|
|  | UNIMPROVED ROADS AND PARKING |
|  | PAVED ROADS AND PARKING |
|  | FORMER BUILDING |
|  | TOPOGRAPHIC CONTOURS
(CONTOUR INTERVAL - 5 FOOT) |
|  | TREES / TREELINE |
|  | PARCEL BOUNDARY |
|  | BRIDGE |
|  | CULVERT WITH HEADWALL |
|  | SURFACE DRAINAGE / CREEK |
|  | MANMADE SURFACE DRAINAGE
FEATURE |
|  | FENCE |
|  | UTILITY POLE |
|  | BERM |

FIGURE 1-3
SITE MAP
RANGE 25, KNOWN DISTANCE RANGE
PARCEL 83Q AND IMPACT AREA
PARCEL 118Q-X
U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018



Numerous mortar rounds were observed by ESE personnel on the ground surface in an impact area behind (north) the Range 25 berm (Parcel 118Q-X) (Figure 1-3). Ordnance items, including mortar and artillery rounds, are sometimes encountered after heavy rains. Numerous 3-inch mortar rounds were observed behind the backstop at this range during the site visit by ESE personnel preparing the environmental baseline survey (ESE, 1998). Personnel of the 142nd Explosive Ordnance Disposal accompanied ESE personnel to this site and report that these 3-inch mortar rounds appeared to be sand-filled or otherwise inert. Practice rounds were sometimes filled with sand (ESE, 1998).

At the Range 25 main site (excluding the range fan), the elevation ranges from 820 feet above mean sea level (North American Vertical Datum of 1988) to 875 feet above mean sea level in the northeast corner of the Impact Area, north of the Range 25 berm. Surface water in the immediate area appears to drain to the west. Local shallow groundwater direction at the site is probably controlled by topography.

Soils at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, fall into the following two soil series (U.S. Department of Agriculture [USDA], 1961):

- The Anniston and Allen Series of soils
- The Philo and Stendal Series of soils.

The Anniston and Allen series of soils consists of strongly acid, deep, well drained soils that have developed in old local alluvium. The parent material washed from the adjacent, higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. Sandstone and quartzite gravel and cobbles as much as 8 inches in diameter are on the surface and throughout the soil. The depth to bedrock at these sites ranges from 2 feet to greater than 10 feet. The depth to the water table is likely greater than 20 feet. The typical soil description is 2 to 10 feet of well-drained stony loam to clay loam over stratified local alluvium, limestone or shale bedrock. Shallow groundwater direction at the site is likely controlled by topography.

Soils that fall into the Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded (AcB2) consist of friable soils that have developed in old alluvium on foot slopes and along the base of mountains (USDA, 1961). The color of the surface soil ranges from very dark brown and dark

brown to reddish brown and dark reddish brown. The texture of subsoil ranges from light clay loam to clay or silty clay loam. The alluvium ranges in thickness from 2 feet to more than 8 feet. Infiltration and runoff are medium, permeability is moderate, and the capacity for available moisture is high. Organic matter is moderately low. Soils that fall into the Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded (AcC2), consist of soils similar to AcB2. In this mapping unit, some severely eroded areas may be common on the surface, as well as a few shallow gullies.

The soils found primarily at the southern end of Range 25 and north of Bains Gap Road along the small, intermittent stream are categorized in the Philo and Stendal Series of soils. The Philo series consists of strongly acid, moderately well-drained soils that are developing in local and general alluvium. The parent material washed mainly from sandstone and shale, but some of it originated from limestone. Philo soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is very dark grayish-brown to dark-brown fine sandy loam, and the subsoil is dark-brown, slightly mottled fine sandy loam.

The Stendal series consists of strongly acid, somewhat poorly drained soils that are developing in general alluvium that washed chiefly from sandstone and shale. Some of the material originated from limestone. These soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is a dark grayish-brown fine sandy loam and the subsurface soil is a dark-brown, mottled fine sandy loam.

For the Philo and Stendal Series soils, the depth to bedrock typically is 6 feet below ground surface (bgs) or greater. The depth to the water table for these series is usually 1 to 2 feet bgs.

The Philo and Stendal fine sandy loams, 0 to 2 percent slopes (PhA) consist of one or both of the series soils which are developing in general alluvium on nearly level first bottoms subject to flooding. The surface soil ranges from very dark grayish brown and grayish brown to dark brown. The subsoil ranges from dark brown to yellowish brown. Mottles in the lower part vary in size and number. A few areas are weakly cemented at depths of 30 to 38 inches bgs. Included are some areas having a silt loam surface soil (USDA, 1961).

1.3 Scope of Work

The scope of work for activities associated with the SI at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, as specified by the statement of work (USACE, 1999a), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the supplemental sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect 53 surface soil samples, 53 subsurface soil samples, 6 groundwater samples, 10 surface water samples, and 10 sediment samples to determine whether potential site-specific chemicals (PSSC) are present at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, and to provide data useful for supporting any future planned corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, fall within the “Possible Artillery Impact Areas” shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999b). Therefore, UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purposes of UXO avoidance. The site-specific UXO safety plan will be used to support sample collection activities at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, if incidental ordnance, explosive, and UXO are encountered and require avoidance.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site, and to recommend further actions, if appropriate. SI sampling reports will be prepared in accordance with current U.S. Environmental Protection Agency (EPA)-Region IV and Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

An environmental baseline survey (EBS) was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require additional evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls
- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA-Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, are parcels where no known or recorded storage, release, or disposal (including migration) of hazardous substances has occurred on site property, but the parcels are qualified as ranges. The Impact Area, Parcel 118Q-X, is qualified (-X) for potential UXO. Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, also require additional evaluation to determine the environmental condition of the parcels.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. This section incorporates the components of the DQO process described in the publication EPA 540-R-93-071, *Data Quality Objectives Process for Superfund* (EPA, 1993). The DQO process as applied to Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The available data related to the SI at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The users of the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and the USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

Summary of Data Quality Objectives
Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X
Site Investigation
Fort McClellan, Calhoun County, Alabama

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation Other contractors, and possible future land users	None	<u>Contaminant Source</u> Range 25, Parcel 83Q and Impact Area, Parcel 118Q-X (explosives and lead) <u>Migration Pathways</u> Infiltration from surface soil infiltration and leaching to groundwater, biotransfer to venison, dust emissions and volatilization to ambient air, groundwater discharge to surface water, and runoff and erosion to surface water and sediment <u>Potential Receptors</u> Residents (future), Recreational site user (current and future) <u>PSSC</u> metals, nitroexplosives, VOCs, SVOCs, herbicides, and pesticides	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 20% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in CESAS Level B data packages	53 surface soil samples + QC
			<u>Subsurface Soil</u>		<u>Subsurface Soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 20% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides		
			<u>Groundwater</u>	Definitive quality data for future decision- making	<u>Groundwater</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 20% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in CESAS Level B data packages	6 groundwater samples + QC
			<u>Surface Water</u>		<u>Surface Water</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 20% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides		
			<u>Sediment</u>		<u>Sediment</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 20% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides		

ADEM - Alabama Department of Environmental Management.
CESAS - Corps of Engineers South Atlantic Savannah.
DOD - U.S. Department of Defense.
EPA - U.S. Environmental Protection Agency.
FTMC - Fort McClellan.
USACE - U.S. Army Corps of Engineers.

SI - Site investigation.
QC - Quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
PSSC - Potential site-specific chemical.
VOC - Volatile Organic Compounds
SVOC - Semi-volatile Organic Compounds

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact scenarios with a contaminated source medium.

Primary contaminant releases were probably limited to training activities including the discharge of lead bullets and ordnance onto the ground. Potential contaminant transport pathways include infiltration and leaching from surface soil to subsurface soil and groundwater, biotransfer to deer through browsing, dust emissions and volatilization to ambient air, groundwater discharge to surface water, surface water runoff, and erosion to surface water and sediment.

Currently, the ranges are not used and are not maintained. Most of the Range 25 study area is open, with little tree cover. The area of investigation, including the main area of Range 25 and the Impact Area, Parcel 118-Q-X, is approximately 100 acres. The range and impact area are not fenced; therefore, people may trespass at the sites for hunting. All buildings have been removed at Range 25. There is not sufficient surface water to support fish habitat for fish consumption. The only plausible receptor under the current land-use scenario is a recreational site user who may hunt. Other potential receptors considered, but not included under the current land-use scenario, are the:

- **Groundskeeper.** The ranges are not currently maintained and will not be in the future.

- **Construction Worker.** The site is unused, and no development or construction is occurring or scheduled.
- **Resident.** The site is not currently used for residential purposes.

Future land use in this area is shown as remediation reserve and passive recreation (FTMC, 1997). The sites may not be deemed safe for public access until remediation has been completed, because of the potential for UXO (FTMC, 1997). Plausible future land-use receptor scenarios addressed in the CSEM include:

- **Resident.** Although the site is not planned for residential use, the residential scenario is considered in order to provide information for the project manager and regulators.
- **Recreational Site User.** Because the future site is planned for passive recreational use, and hunting is a viable option, the recreational site user is included. Fish ingestion will not be evaluated because the streams are too small to support fish for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

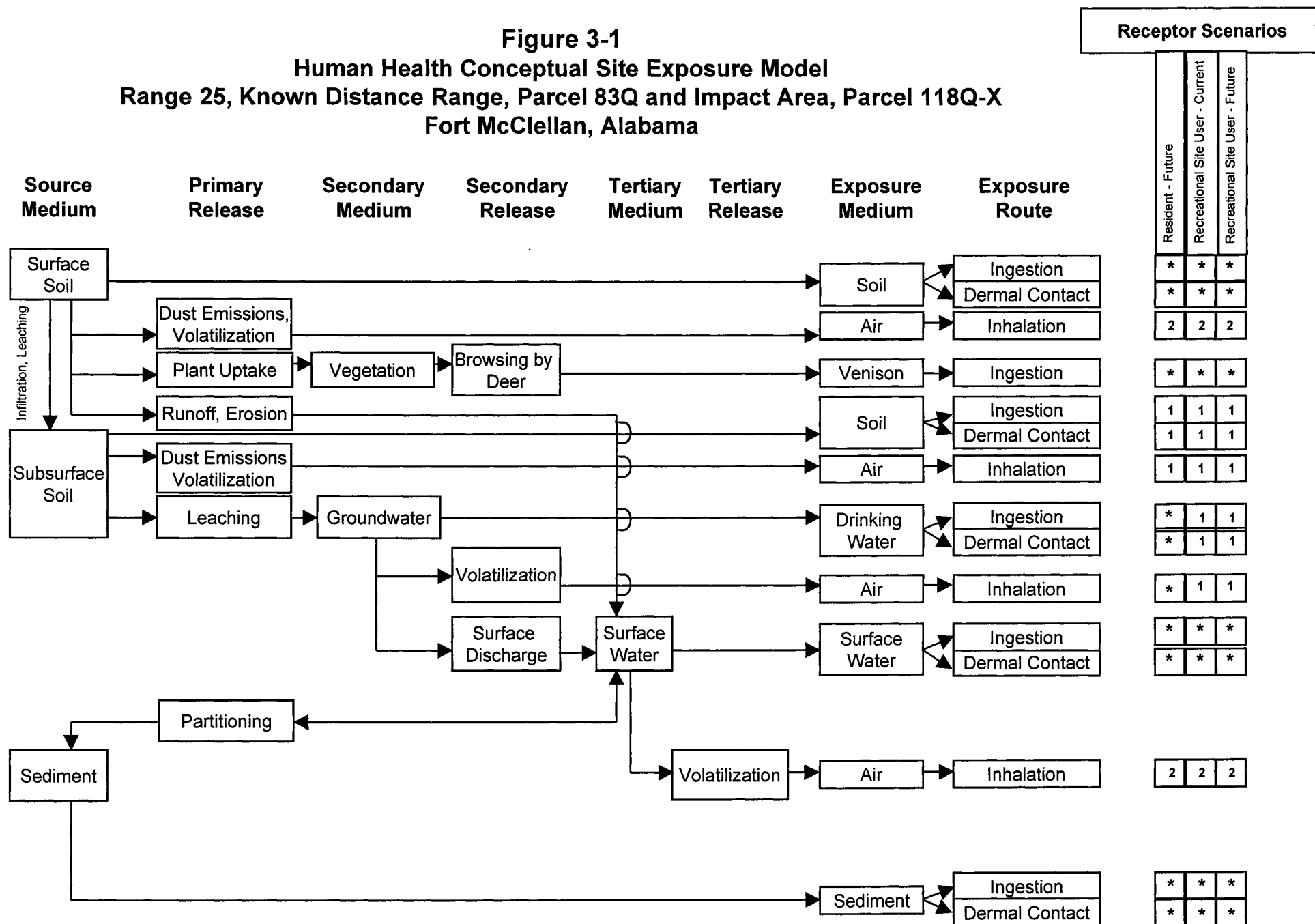
3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process is a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the SI at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, will be based on comparing detected site chemicals of potential concern to site-specific screening levels developed in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). EPA definitive data with CESAS Level B data packages will be used to determine whether or not PSSCs are detected in site media. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Figure 3-1
Human Health Conceptual Site Exposure Model
Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X
Fort McClellan, Alabama



* = Complete exposure pathway evaluated in the streamlined risk assessment.

1 = Incomplete exposure pathway.

2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g., surface water and sediment sampling, specific ecological assessment methods) will be addressed in accordance with the procedures in the WP.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, surface water, and sediment samples will be collected and analyzed to meet the objectives of the SI at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 Methods Update III, where available; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, fall within the “Possible Artillery Impact Area” shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999b). Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety work plan provides technical guidance for ordnance and explosives avoidance activities during sample collection activities at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. The site-specific UXO safety work plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a).

4.1.1 Surface UXO Survey

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed and will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Chapter 4.0 and Appendices D and E of the approved SAP (IT, 2000a).

4.1.2 Downhole UXO Survey

During the soil boring and downhole sampling, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Chapter 4.0 of the SAP (IT, 2000a), will continue until undisturbed soil is encountered or the borehole has been advanced to 12 feet below ground surface, whichever is reached first.

4.1.3 Utility Clearances

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP (IT, 2000a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear the proposed locations for utilities, and obtain digging permits. Once the

locations are approved for intrusive sampling (for both UXO and utility avoidance), the stakes will be labeled as cleared.

4.2 Environmental Sampling

The environmental sampling program at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, includes the collection of surface soil, subsurface soil, groundwater, surface water, and sediment samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted at the site. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

4.2.1 Surface Soil Sampling

Surface soil samples will be collected from 53 locations at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X.

4.2.1.1 Sample Locations and Rationale

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.1.2 Sample Collection

Surface soil samples will be collected from the upper 1 foot of soil using a carbon steel split-spoon and the procedures by direct-push methodology as specified in Section 4.9 of the SAP (IT, 2000a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 4.15 of the SAP. Surface soil samples will be screened for information purposes only and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama
 Page 1 of 5

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Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama
 Page 2 of 5

KN\4040\Range25\FSP\tbl4-1\8/31/01\12:43 PM

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama
Page 3 of 5

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
Parcel 83Q	HR-83Q-GP33	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the south side of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-83Q-GP34	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the south side of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-83Q-GP35	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the south side of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-83Q-GP36	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the south side of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-83Q-GP37	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the south side of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-83Q-MW01	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center of the range midway between the second and third firing line berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-83Q-MW02	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center of the range midway between the fourth and fifth firing line berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-83Q-MW03	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed in the center of the range south of the target berm for Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-83Q-MW04	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be placed east of the main range area and outside of the northeast corner of Range 25. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-83Q-SW/SD01	Surface water and Sediment	The sample location is in the intermittent stream just east of the intersection of Bains Gap Road and Iron Mountain Road. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-83Q-SW/SD02	Surface water and Sediment	The sample location is in the intermittent stream just west of Iron Mountain Road and north of the intersection of Bains Gap Road and Iron Mountain Road. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-83Q-SW/SD03	Surface water and Sediment	The sample location is in the intermittent stream at the southwest corner of the main area for Range 25, east of Iron Mountain Road. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-83Q-SW/SD04	Surface water and Sediment	The sample location is in the intermittent stream between the third and fourth firing line for Range 25 on the east side of the range area. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-83Q-SW/SD05	Surface water and Sediment	The sample location is in the intermittent stream between the third and fourth firing line for Range 25 on the west side of the range area. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-83Q-SW/SD06	Surface water and Sediment	The sample location is in the intermittent stream west of the main range area, north of the parking lot along the western side of Range 25. Sample data will indicate if contaminant releases have occurred from runoff from Range 25 from former activities in this area. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.

Table 4-1

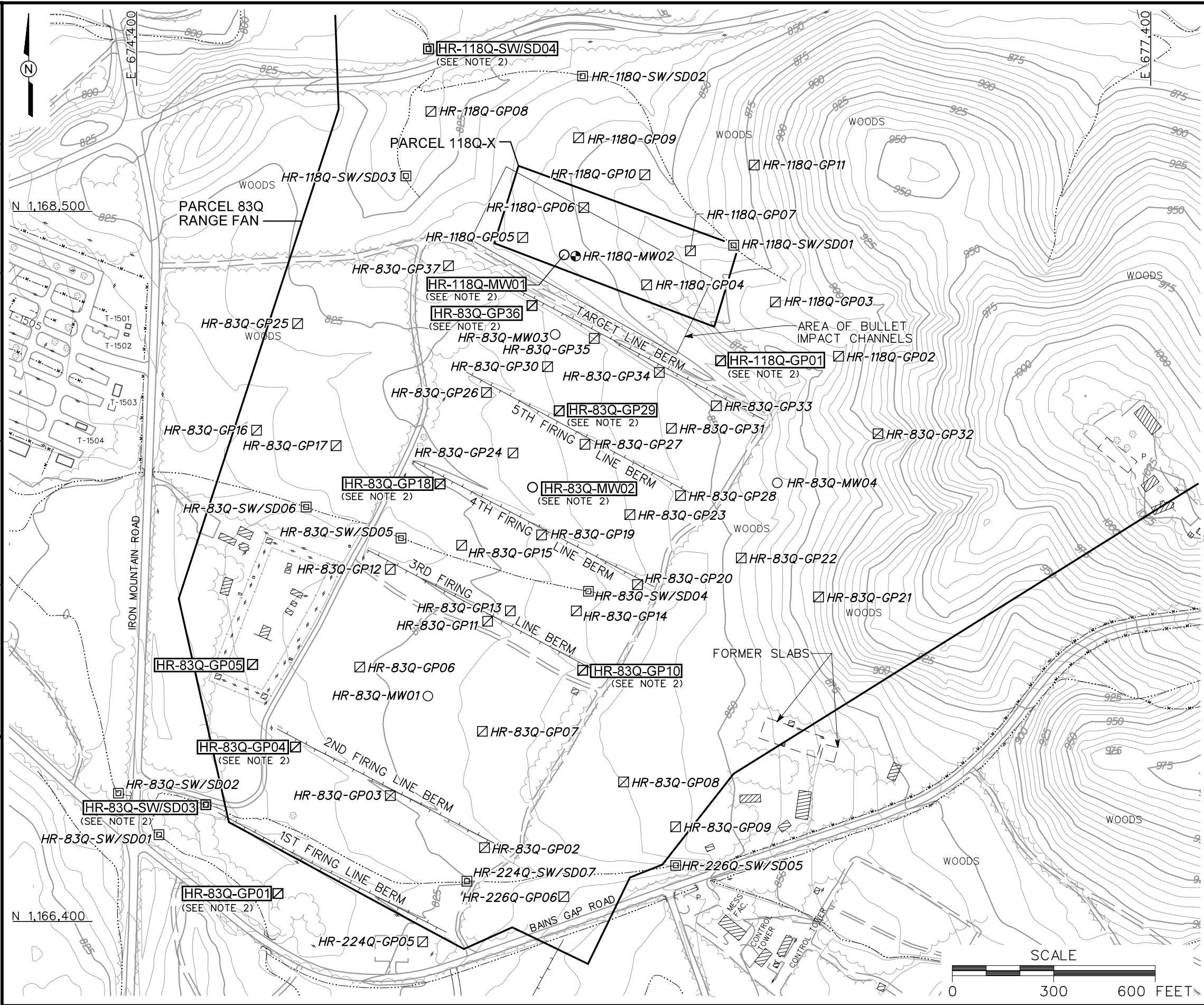
Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama
Page 4 of 5

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
Parcel 118Q-X	HR-118Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the north side of the target berm for Range 25, southeast of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the northeast of the target berm for Range 25, east of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed on the east of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located within the southeastern area of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP05	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located within the southwestern area of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP06	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located within the northern area of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP07	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located within the northeastern area of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP08	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located northwest of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP09	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located north of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP10	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located north of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-GP11	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be located north of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-118Q-MW01	Surface soil subsurface soil and groundwater	Soil boring for surface soil, subsurface soil, and groundwater samples to be located near the southern boundary of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the residuum aquifer.
	HR-118Q-MW02	Groundwater	Soil boring for installation of bedrock monitoring well to collect groundwater samples. Monitoring well to be located near the southern boundary of Parcel 118Q. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the site and if contaminated soil exists at this location. The monitoring well location will be used to establish a local groundwater flow direction and site-specific geology, and provide information on groundwater quality in the bedrock aquifer.
	HR-118Q-SW/SD01	Surface water and Sediment	The sample location will be placed in the intermittent stream at the northeast corner of Parcel 118Q. Sample data will indicate if contaminant releases have occurred from runoff upstream of this area east of Parcel 118Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-118Q-SW/SD02	Surface water and Sediment	The sample location will be placed in the intermittent stream north of Parcel 118Q. Sample data will indicate if contaminant releases have occurred from runoff from Parcel 118Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.

Table 4-1

Sampling Locations and Rationale
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, Parcel 226Q, and Former Pistol Range, Parcel 227Q
Fort McClellan, Alabama
Page 5 of 5

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
Parcel 118Q-X	HR-118Q-SW/SD03	Surface water and Sediment	The sample location will be placed in the intermittent stream west of Parcel 118Q. Sample data will indicate if contaminant releases have occurred from runoff from Parcel 118Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.
	HR-118Q-SW/SD04	Surface water and Sediment	The sample location will be placed in the intermittent stream northwest of Parcel 118Q. Sample data will indicate if contaminant releases have occurred from runoff from Parcel 118Q. Sample data will also be used to assess potential impacts to aquatic biota in the waterway and other ecological receptors that may utilize the waterway for food and/or habitat purposes.



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- FORMER BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- BERM
- PROPOSED BEDROCK MONITORING WELL LOCATION
- PROPOSED RESIDUUM MONITORING WELL LOCATION (WITH SURFACE AND SUBSURFACE SOIL SAMPLE)
- PROPOSED SURFACE WATER/SEDIMENT SAMPLE LOCATION
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

NOTES:

- SURFACE SOIL SAMPLES 0-1.0 FOOT
SUBSURFACE OIL SAMPLES 2-4 FEET
SEDIMENT SAMPLES 0-0.5 FOOT
- SAMPLES FROM THESE LOCATION WILL BE ANALYZED FOR VOLATILES ORGANIC COMPOUNDS, SEMI-VOLATILES ORGANIC COMPOUNDS, PESTICIDES AND HERBICIDES IN ADDITION TO METALS AND NITROAROMATIC /NITRAMINE EXPLOSIVES FOR ALL SAMPLES.

FIGURE 4-1
PROPOSED SAMPLE LOCATION MAP
RANGE 25, KNOWN DISTANCE RANGE
PARCEL 83Q AND IMPACT AREA
PARCEL 118Q-X
U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

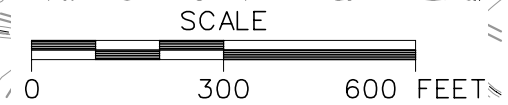


Table 4-2

Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities,
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, 226Q, and Former Pistol Range, Parcel 227Q
Page 1 of 5

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-83Q-GP01	HR-83Q-GP01-SS-NN0001-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP01-DS-NN0002-REG	2-4				
HR-83Q-GP02	HR-83Q-GP02-SS-NN0003-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP02-DS-NN0004-REG	2-4	HR-83Q-GP02-DS-NN0005-FD			
HR-83Q-GP03	HR-83Q-GP03-SS-NN0006-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP03-DS-NN0007-REG	2-4				
HR-83Q-GP04	HR-83Q-GP04-SS-NN0008-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP04-DS-NN0009-REG	2-4			HR-83Q-GP04-DS-NN0009-MS/MSD	
HR-83Q-GP05	HR-83Q-GP05-SS-NN0010-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP05-DS-NN0011-REG	2-4				
HR-83Q-GP06	HR-83Q-GP06-SS-NN0012-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP06-DS-NN0013-REG	2-4				
HR-83Q-GP07	HR-83Q-GP07-SS-NN0014-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP07-DS-NN0015-REG	2-4				
HR-83Q-GP08	HR-83Q-GP08-SS-NN0016-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP08-DS-NN0017-REG	2-4	HR-83Q-GP08-DS-NN0018-FD			
HR-83Q-GP09	HR-83Q-GP09-SS-NN0019-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP09-DS-NN0020-REG	2-4				
HR-83Q-GP10	HR-83Q-GP10-SS-NN0021-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP10-DS-NN0022-REG	2-4				
HR-83Q-GP11	HR-83Q-GP11-SS-NN0023-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP11-DS-NN0024-REG	2-4				
HR-83Q-GP12	HR-83Q-GP12-SS-NN0025-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP12-DS-NN0026-REG	2-4				

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities,
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, 226Q, and Former Pistol Range, Parcel 227Q**
Page 2 of 5

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-83Q-GP13	HR-83Q-GP13-SS-NN0027-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP13-DS-NN0028-REG	2-4				
HR-83Q-GP14	HR-83Q-GP14-SS-NN0029-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP14-DS-NN0030-REG	2-4				
HR-83Q-GP15	HR-83Q-GP15-SS-NN0031-REG	0-1			HR-83Q-GP15-SS-NN0031-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP15-DS-NN0032-REG	2-4				
HR-83Q-GP16	HR-83Q-GP16-SS-NN0033-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP16-DS-NN0034-REG	2-4				
HR-83Q-GP17	HR-83Q-GP17-SS-NN0035-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP17-DS-NN0036-REG	2-4				
HR-83Q-GP18	HR-83Q-GP18-SS-NN0037-REG	0-1	HR-83Q-GP18-SS-NN0038-FD			TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP18-DS-NN0039-REG	2-4				
HR-83Q-GP19	HR-83Q-GP19-SS-NN0040-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP19-DS-NN0041-REG	2-4				
HR-83Q-GP20	HR-83Q-GP20-SS-NN0042-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP20-DS-NN0043-REG	2-4				
HR-83Q-GP21	HR-83Q-GP21-SS-NN0044-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP21-DS-NN0045-REG	2-4				
HR-83Q-GP22	HR-83Q-GP22-SS-NN0046-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP22-DS-NN0047-REG	2-4	HR-83Q-GP22-DS-NN0048-FD			
HR-83Q-GP23	HR-83Q-GP23-SS-NN0049-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP23-DS-NN0050-REG	2-4				
HR-83Q-GP24	HR-83Q-GP24-SS-NN0051-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP24-DS-NN0052-REG	2-4				

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities,
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, 226Q, and Former Pistol Range, Parcel 227Q
Page 3 of 5**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-83Q-GP25	HR-83Q-GP25-SS-NN0053-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP25-DS-NN0054-REG	2-4				
HR-83Q-GP26	HR-83Q-GP26-SS-NN0055-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP26-DS-NN0056-REG	2-4				
HR-83Q-GP27	HR-83Q-GP27-SS-NN0057-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP27-DS-NN0058-REG	2-4				
HR-83Q-GP28	HR-83Q-GP28-SS-NN0059-REG	0-1	HR-83Q-GP28-SS-NN0060-FD			TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP28-DS-NN0061-REG	2-4				
HR-83Q-GP29	HR-83Q-GP29-SS-NN0062-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP29-DS-NN0063-REG	2-4				
HR-83Q-GP30	HR-83Q-GP30-SS-NN0064-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP30-DS-NN0065-REG	2-4			HR-83Q-GP30-DS-NN0065-MS/MSD	
HR-83Q-GP31	HR-83Q-GP31-SS-NN0066-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP31-DS-NN0067-REG	2-4				
HR-83Q-GP32	HR-83Q-GP32-SS-NN0068-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP32-DS-NN0069-REG	2-4				
HR-83Q-GP33	HR-83Q-GP33-SS-NN0070-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP33-DS-NN0071-REG	2-4	HR-83Q-GP33-DS-NN0072-FD			
HR-83Q-GP34	HR-83Q-GP34-SS-NN0073-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP34-DS-NN0074-REG	2-4				
HR-83Q-GP35	HR-83Q-GP35-SS-NN0075-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP35-DS-NN0076-REG	2-4	HR-83Q-GP35-DS-NN0077-FD			
HR-83Q-GP36	HR-83Q-GP36-SS-NN0078-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-GP36-DS-NN0079-REG	2-4				

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities,
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, 226Q, and Former Pistol Range, Parcel 227Q**
Page 4 of 5

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-83Q-GP37	HR-83Q-GP37-SS-NN0080-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-GP37-DS-NN0081-REG	2-4				
HR-83Q-MW01	HR-83Q-MW01-SS-NN0082-REG	0-1			HR-83Q-MW01-SS-NN0082-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-MW01-DS-NN0083-REG	2-4				
HR-83Q-MW02	HR-83Q-MW02-SS-NN0084-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-83Q-MW02-DS-NN0085-REG	2-4				
HR-83Q-MW03	HR-83Q-MW03-SS-NN0086-REG	0-1	HR-83Q-MW03-SS-NN0087-FD			TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-MW03-DS-NN0088-REG	2-4				
HR-83Q-MW04	HR-83Q-MW04-SS-NN0089-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-83Q-MW04-DS-NN0090-REG	2-4				
HR-118Q-GP01	HR-118Q-GP01-SS-NP0001-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-118Q-GP01-DS-NP0002-REG	2-4				
HR-118Q-GP02	HR-118Q-GP02-SS-NP0003-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP02-DS-NP0004-REG	2-4				
HR-118Q-GP03	HR-118Q-GP03-SS-NP0005-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP03-DS-NP0006-REG	2-4				
HR-118Q-GP04	HR-118Q-GP04-SS-NP0007-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP04-DS-NP0008-REG	2-4				
HR-118Q-GP05	HR-118Q-GP05-SS-NP0009-REG	0-1	HR-118Q-GP05-SS-NP0010-FD			TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP05-DS-NP0011-REG	2-4				
HR-118Q-GP06	HR-118Q-GP06-SS-NP0012-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP06-DS-NP0013-REG	2-4				
HR-118Q-GP07	HR-118Q-GP07-SS-NP0014-REG	0-1			HR-118Q-GP07-DS-NP0015-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP07-DS-NP0015-REG	2-4				

Table 4-2

**Surface Soil and Subsurface Soil Sample Designations and QA/QC Sample Quantities,
Former Pistol Range South of Range 25, Parcel 224Q, Former Machine Gun Range, 226Q, and Former Pistol Range, Parcel 227Q**
Page 5 of 5

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-118Q-GP08	HR-118Q-GP08-SS-NP0016-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP08-DS-NP0017-REG	2-4				
HR-118Q-GP09	HR-118Q-GP09-SS-NP0018-REG	0-1	HR-118Q-GP09-SS-NP0019-FD			TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP09-DS-NP0020-REG	2-4				
HR-118Q-GP10	HR-118Q-GP10-SS-NP0021-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP10-DS-NP0022-REG	2-4				
HR-118Q-GP11	HR-118Q-GP11-SS-NP0023-REG	0-1				TAL Metals, Nitroaromatic/Nitramine Explosives
	HR-118Q-GP11-DS-NP0024-REG	2-4	HR-118Q-GP11-DS-NP0025-FD			
HR-118Q-MW01	HR-118Q-MW01-SS-NP0026-REG	0-1			HR-118Q-MW01-SS-NP0026-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
	HR-118Q-MW01-DS-NP0027-REG	2-4				

^a Actual sample depth selected for analysis will be at the discretion of the site geologist and will be based on field observation.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

TCL - Target compound list

VOC - Volatile organic compound

SVOC - Semivolatile organic compound

CL - Chlorinated

OP - Organophosphate

4.2.2 Subsurface Soil Sampling

Subsurface soil samples will be collected from 53 borings installed at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X.

4.2.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The sampling rationale for each subsurface soil sample location is listed in Table 4-1. Subsurface soil samples to be collected are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface in the unsaturated zone. The soil borings will be advanced and soil samples collected using a carbon steel split-spoon and the sampling procedures specified in Section 4.9 of the SAP (IT, 2000a).

Soil samples will be collected between 2 to 4 bgs or until either groundwater or refusal is reached. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicates a reading exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples will be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. More than one subsurface soil sample will be collected from a single boring if field measurements and observations indicate a possible layer of PSSCs and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in

this SFSP are listed in Section 5.0, Table 5-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.3 Permanent Residuum Monitoring Wells

Five permanent residuum monitoring wells will be installed at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for each monitoring well location is presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter (ID), Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. The well will be installed so the well screen straddles the water table.

Soil samples for lithology will be collected continuously every 5 feet to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID. The monitoring wells will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Permanent Bedrock Monitoring Well

One bedrock monitoring well will be installed using a combination of hollow-stem auger and air rotary drilling techniques at Range 25, Parcel 83Q. The proposed bedrock monitoring well location is shown on Figure 4-1. There will not be any soil samples collected from the bedrock monitoring well for chemical analysis.

An air rotary rig with a 12-inch percussion bit or rotary bit will be used to drill the borehole from land surface to 10 feet into bedrock. The borehole diameter will be approximately 12 inches, such that an 8-inch ID carbon steel International Pipe Standard outer casing will be installed into the borehole from land surface to 5 feet into bedrock. A minimum of a 2-inch annular space between the outer casing and borehole wall will be required. The 8-inch carbon steel outer

casing will be grouted in place using a tremie pipe suspended in the annulus outside of the casing. Bentonite-cement grout will be mixed using approximately 6.5 to 7 gallons of water and 5 pounds of bentonite per 94-pound bag of Type I Portland cement. After the grout has cured a minimum of 48 hours, an HQ wireline core barrel will be used to collect core samples continuously from the bottom of the outer casing to a minimum of 20 feet into bedrock. The hole depth into bedrock will be increased if groundwater is not encountered. After completion of core sample collection, an 8-inch air percussion bit will be used to ream the hole a minimum of 15 feet below the bottom of the outer casing and into bedrock. The compressor on the drill rig will be equipped with an air filter between the compressor and the drill bit. Water will be the only lubricant allowed during drilling operations.

A four-inch monitoring well will be installed inside the outer casing. The well casing will consist of new, 4-inch ID, Schedule 40, threaded, flush-joint, PVC pipe. Attached to the bottom of the well casing will be a section of new threaded, flush joint 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long. Attached to the bottom of the screen will be a sump, approximately 3 to 5 feet long, composed of new, 4-inch ID, Schedule 40, threaded, flush-joint PVC pipe. After the casing and screen materials are lowered into the boring, a gravel pack will be installed around the well screen and the inside casing will be grouted from the top of the gravel pack to land surface. The gravel pack will consist of 20/40 silica sand and will be tremied into place from the bottom of the sump to approximately 5 feet above the top of the screen. A bentonite seal approximately 5 feet thick will be placed above the gravel pack. The remaining annular space will be grouted with a bentonite-cement mixture (described above) and tremied in place from the top of the bentonite seal to ground surface. The bedrock monitoring well will be drilled, installed, and developed as specified in Section 4.8 and Appendix C of the SAP (IT, 2000a). Groundwater samples will not be collected from the bedrock well for a period of at least 14 days after well development. The proposed bedrock monitoring well rationale is presented in Table 4-1.

4.2.5 Groundwater Sampling

Groundwater samples will be collected from the six monitoring wells completed at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, as presented in Sections 4.2.3 and 4.2.4.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations, depths, and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, the static water level will be measured from each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 4.18 of the SAP (IT, 2000a). Groundwater samples will be collected in accordance with the procedures outlined in Section 4.9.1.4 of the SAP.

Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP (IT, 2000a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.5 Surface Water Sampling

Ten surface water samples will be collected at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. Surface water samples will be collected from intermittent streams in and around the site.

4.2.5.1 Sample Locations and Rationale

The rationale for each surface water sampling location is listed in Table 4-1. The surface water samples will be collected from the proposed locations on Figure 4-1. Surface water sample designations and QA/QC sample requirements are listed in Table 4-4. The exact sampling locations will be determined in the field by the ecological sampler, based on drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The surface water samples will be collected in accordance with procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Range 25, Known Distance Range, Parcel 83Q and Impact Area, Parcel 118Q-X
Fort McClellan, Alabama**

Sample Location	Sample Designation	Sample Matrix ^a	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
HR-83Q-MW01	HR-83Q-MW01-GW-NN3001-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-MW02	HR-83Q-MW02-GW-NN3002-REG	Groundwater	HR-83Q-MW02-GW-NN3003-FD			TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
HR-83Q-MW03	HR-83Q-MW03-GW-NN3004-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-MW04	HR-83Q-MW04-GW-NN3005-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-118Q-MW01	HR-118Q-MW01-GW-NP3001-REG	Groundwater			HR-118Q-MW01-GW-NP3001-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
HR-118Q-MW02	HR-118Q-MW02-GW-NP3002-REG	Groundwater				TAL Metals, Nitroaromatic/Nitramine Explosives

^a Groundwater samples will be collected from the approximate midpoint of the saturated screened interval of the monitoring well.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

TCL - Target compound list

VOC - Volatile organic compound

SVOC - Semivolatile organic compound

CL - Chlorinated

OP - Organophosphate

Table 4-4

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X
Fort McClellan, AL**

Sample Location	Sample Designation	Sample Matrix	Sample Depth (ft)	QA/QC Samples			Analytical Suite
				Field Duplicates	Field Splits	MS/MSD	
HR-83Q-SW/SD01	HR-83Q-SW/SD01-SW-NN2001-REG HR-83Q-SW/SD01-SD-NN1001-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-SW/SD02	HR-83Q-SW/SD02-SW-NN2002-REG HR-83Q-SW/SD02-SD-NN1002-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-SW/SD03	HR-83Q-SW/SD03-SW-NN2003-REG HR-83Q-SW/SD03-SD-NN1003-REG	Surface water sediment	a 0-0.5	HR-83Q-SW/SD03-SW-NN2004-FD HR-83Q-SW/SD03-SD-NN1004-FD			TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides
HR-83Q-SW/SD04	HR-83Q-SW/SD04-SW-NN2005-REG HR-83Q-SW/SD04-SD-NN1005-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-SW/SD05	HR-83Q-SW/SD05-SW-NN2006-REG HR-83Q-SW/SD05-SD-NN1006-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-83Q-SW/SD06	HR-83Q-SW/SD06-SW-NN2007-REG HR-83Q-SW/SD06-SD-NN1007-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-118Q-SW/SD01	HR-118Q-SW/SD01-SW-NP2001-REG HR-118Q-SW/SD01-SD-NP1001-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-118Q-SW/SD02	HR-118Q-SW/SD02-SW-NP2002-REG HR-118Q-SW/SD02-SD-NP1002-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-118Q-SW/SD03	HR-118Q-SW/SD03-SW-NP2003-REG HR-118Q-SW/SD03-SD-NP1003-REG	Surface water sediment	a 0-0.5				TAL Metals, Nitroaromatic/Nitramine Explosives
HR-118Q-SW/SD04	HR-118Q-SW/SD04-SW-NP2004-REG HR-118Q-SW/SD04-SD-NP1004-REG	Surface water sediment	a 0-0.5			HR-118Q-SW/SD04-SW-NP2004-MS/MSD HR-118Q-SW/SD04-SD-NP1004-MS/MSD	TAL Metals, Nitroaromatic/Nitramine Explosives VOCs, SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides

^a Sample depth will depend on where sufficient first water is encountered to collect a water sample.

FD - Field duplicate.

FS - Field split.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

REG - Field sample.

TAL - Target analyte list.

TCL - Target compound list

VOC - Volatile organic compound

SVOC - Semivolatile organic compound

CL - Chlorinated

for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.2.6 Sediment Sampling

Ten sediment samples will be collected at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. These sediment samples will be collected at the same locations as the surface water samples described in Section 4.2.5.

4.2.6.1 Sample Locations and Rationale

The proposed locations for the sediment samples are shown in Figure 4-1. The rationale for each sediment sampling location is presented in Table 4-1. The sediment sample designations and QA/QC sample requirements are listed in Table 4-4. The actual sediment sample points will be at the discretion of the ecological sampler, based on the drainage pathways and actual field observations.

4.2.6.2 Sample Collection

Sediment samples will be collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and COC will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

4.3 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 2000a). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.4 Surveying of Sample Locations

All areas at this site must be cleared for UXO avoidance before any surveying activities will commence. Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required in surveying the wells. Monitoring wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for a specific suite of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, consist of the following list of analytical suites:

- Target Analyte List Metals - Method 6010B/7000.
- Nitroaromatic and Nitramine Explosives - Method 8330.

In addition, approximately 20 percent of the samples from the proposed sample locations will be analyzed for the following list of analytical suites:

- Target Compound List Volatile Organic Compounds – Method 5035/8260B
- Target Compound List Semivolatile Organic Compounds – Method 8270C
- Chlorinated pesticides - Method 8081A
- Chlorinated herbicides - Method 8151A
- Organophosphate pesticides - Method 8141A

Sediment samples will be analyzed for the following list of parameters:

- Total Organic Carbon - Method 9060
- Grain Size - ASTM D-421/D-422.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard-copy data packages by the laboratory using Contract

Table 4-5

**Analytical Samples
Site Investigation
Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a					EMAX	QA Lab
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	Splits w/ QA Lab (5%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis	Total No. Analysis
Parcels 83Q and 118Q-X: 16 water matrix samples (6 groundwater samples and 10 surface water samples); 116 soil matrix samples (53 surface soil samples, 53 subsurface soil samples, and 10 sediment samples)													
All samples will be analyzed for the following parameters:													
TAL Metals	6010B/7000	water	normal	16	1	16	2		1		2	22	0
Nitroaromatic/Nitramine Explosives	8330	water	normal	16	1	16	2		1		2	22	0
TAL Metals	6010B/7000	soil	normal	116	1	116	12		6		1	141	0
Nitroaromatic/Nitramine Explosives	8330	soil	normal	116	1	116	12		6		1	141	0
Approximately 20 % of the samples will be analyzed for the following parameters:													
TCL VOCs	5035/8260B	Water	normal	4	1	4	1		1	2	1	10	0
TCL SVOCs	8270C	Water	normal	4	1	4	1		1		1	8	0
CL Pesticides	8081A	Water	normal	4	1	4	1		1		1	8	0
OP Pesticides	8141A	Water	normal	4	1	4	1		1		1	8	0
CI Herbicides	8151A	Water	normal	4	1	4	1		1		1	8	0
TCL VOCs	5035/8260B	soil	normal	22	1	22	2		1		2	28	0
TCL SVOCs	8270C	soil	normal	22	1	22	2		1		2	28	0
CL Pesticides	8081A	soil	normal	22	1	22	2		1		2	28	0
OP Pesticides	8141A	soil	normal	22	1	22	2		1		2	28	0
CI Herbicides	8151A	soil	normal	22	1	22	2		1		2	28	0
Sediment samples only:													
TOC	9060	sediment	normal	10	1	10						10	0
Grain Size	ASTM421/422	sediment	normal	10	1	10						10	0
Parcels 83Q and 118Q-X Subtotal:						414	43	0	24	2	21	528	0

^aField duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number. Trip blank samples will be collected in association with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: EMAX Laboratories, Inc
1835 205th Street
Torrance, CA 90501
Attn: Elizabeth McIntyre
Tel: 424-618-8889
Fax: 424-618-0818

MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
TAL - Target analyte list.
TOC - Total organic carbon.
ASTM- American Society for Testing and Materials

TCL - Target compound list
VOC - Volatile organic compound
SVOC - Semivolatile organic compound
CL - Chlorinated
OP - Organophosphate

Laboratory Program-like forms and electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

4.6 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13.2 of the SAP (IT, 2000a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Sample Receiving/Elizabeth McIntyre
EMAX Laboratories, Inc.
1835 205th Street
Torrance, California 90501
Telephone: (424) 618-8889.

4.7 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 2000a). The IDW generated at Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X, is expected to include decontamination fluids, drill cuttings, and disposable personal protective equipment. The IDW will be staged in the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Range 25, Known Distance Range, Parcel 83Q, and Impact Area, Parcel 118Q-X. The SSHP attachment will be used in conjunction with the installation-wide SHP.

5.0 Project Schedule

The project schedule for the SI activities will be provided by the IT Project Manager to the Base Realignment and Closure Cleanup Team and will be in accordance with the WP.

6.0 References

Environmental Science and Engineering, Inc. (ESE), 1998, ***Final Environmental Baseline Survey, Fort McClellan, Alabama***, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

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IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report***, July.

IT Corporation (IT), 1998, ***Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama***, August.

U.S. Army Corps of Engineers (USACE), 1999a, ***Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama***, June.

U.S. Army Corps of Engineers (USACE), 1999b, ***Archives Search Report, Maps, Fort McClellan, Anniston, Alabama***, July.

U.S. Army Corps of Engineers (USACE), 1994, ***Requirements for the Preparation of Sampling and Analysis Plan***, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture (USDA), 1961, ***Soil Survey, Calhoun County, Alabama***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Environmental Protection Agency (EPA), 1993, ***Data Quality Objectives Process for Superfund, Interim Final Guidance***, EPA 540-R-93-071, September.

U.S. Environmental Protection Agency (EPA), 1990, ***Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama (TS-PIC-89334)***, Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring Systems Laboratory.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid	BTV	background threshold value	DEH	Directorate of Engineering and Housing
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	BW	biological warfare	DEP	depositional soil
2,4,5-TP	silvex	BZ	breathing zone; 3-quinuclidinyl benzilate	DI	deionized
3D	3D International Environmental Group	C	ceiling limit value	DIMP	di-isopropylmethylphosphonate
Abs	skin absorption	Ca	carcinogen	DMMP	dimethylmethylphosphonate
Amsl	above mean sea level	CAB	chemical warfare agent breakdown products	DOD	U.S. Department of Defense
AC	hydrogen cyanide	CAMU	corrective action management unit	DOJ	U.S. Department of Justice
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	CCAL	continuing calibration	DOT	U.S. Department of Transportation
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	CCB	continuing calibration blank	DP	direct-push
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	CD	compact disc	DPDO	Defense Property Disposal Office
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	DPT	direct-push technology
ACGIH	American Conference of Governmental Industrial Hygienists	CERFA	Community Environmental Response Facilitation Act	DQO	data quality objective
ADEM	Alabama Department of Environmental Management	CESAS	Corps of Engineers South Atlantic Savannah	DRMO	Defense Reutilization and Marketing Office
AEC	U.S. Army Environmental Center	CG	carbonyl chloride (phosgene)	DRO	diesel range organics
AEL	airborne exposure limit	CFC	chlorofluorocarbon	DS	deep (subsurface) soil
AHA	ammunition holding area	ch	inorganic clays of high plasticity	DS2	Decontamination Solution Number 2
AL	Alabama	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine	DWEL	drinking water equivalent level
amb.	amber	CK	cyanogen chloride	E&E	Ecology and Environment, Inc.
ANAD	Anniston Army Depot	cl	inorganic clays of low to medium plasticity	EBS	environmental baseline survey
AOC	area of concern	Cl.	chlorinated	EE/CA	engineering evaluation and cost analysis
APT	armor-piercing tracer	CLP	Contract Laboratory Program	Elev.	elevation
ARAR	applicable or relevant and appropriate requirement	CN	chloroacetophenone	EM	electromagnetic
AREE	area requiring environmental evaluation	CNB	chloroacetophenone, benzene, and carbon tetrachloride	EM31	Geonics Limited EM31 Terrain Conductivity Meter
ASP	Ammunition Supply Point	CNS	chloroacetophenone, chloropicrin, and chloroform	EM61	Geonics Limited EM61 High-Resolution Metal Detector
ASR	Archives Search Report	Co-60	cobalt-60	EOD	explosive ordnance disposal
AST	aboveground storage tank	COC	chain of custody; contaminant of concern	EODT	explosive ordnance disposal team
ASTM	American Society for Testing and Materials	COE	Corps of Engineers	EPA	U.S. Environmental Protection Agency
ATV	all-terrain vehicle	Con	skin or eye contact	EPC	exposure point concentration
AWWSB	Anniston Water Works and Sewer Board	COPC	contaminant of potential concern	EPIC	Environmental Photographic Interpretation Center
‘B’	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	COPEC	contaminant of potential environmental concern	ER	equipment rinsate
BCF	blank correction factor	CRL	certified reporting limit	ESE	Environmental Science and Engineering, Inc.
BCT	BRAC Cleanup Team	CRZ	contamination reduction zone	ESN	Environmental Services Network, Inc.
BEHP	bis(2-ethylhexyl)phthalate	Cs-137	cesium-137	ESV	ecological screening value
BFB	bromofluorobenzene	CS	ortho-chlorobenzylidene-malononitrile	Exp.	explosives
BFE	base flood elevation	CSEM	conceptual site exposure model	E-W	east to west
BG	Bacillus globigii	ctr.	container	EZ	exclusion zone
bgs	below ground surface	CWA	chemical warfare agent	FAR	Federal Acquisition Regulations
BHC	betahexachlorocyclohexane	CWM	chemical warfare material; clear, wide mouth	FB	field blank
bkg	background	CX	dichloroformoxime	FD	field duplicate
bls	below land surface	‘D’	duplicate; dilution	FedEx	Federal Express, Inc.
BOD	biological oxygen demand	DAF	dilution-attenuation factor	FEMA	Federal Emergency Management Agency
BRAC	Base Realignment and Closure	DANC	decontamination agent, non-corrosive	FFE	field flame expedient
Braun	Braun Intertec Corporation	°C	degrees Celsius	Fil	filtered
BSC	background screening criterion	°F	degrees Fahrenheit	Flt	filtered
BTAG	Biological Technical Assistance Group	DCE	dichloroethene	FML	flexible membrane liner
BTEX	benzene, toluene, ethyl benzene, and xylenes	DDD	dichlorodiphenyldichloroethane	FMP 1300	Former Motor Pool 1300
BTOC	below top of casing	DDE	dichlorodiphenyldichloroethene	FOMRA	Former Ordnance Motor Repair Area
		DDT	dichlorodiphenyltrichloroethane	Foster Wheeler	Foster Wheeler Environmental Corporation

List of Abbreviations and Acronyms (Continued)

Frtn	fraction	ID	inside diameter	MINICAMS	miniature continuous air sampling system
FS	field split; feasibility study	IDL	instrument detection limit	ml	inorganic silts and very fine sands
FSP	field sampling plan	IDLH	immediately dangerous to life or health	mL	milliliter
ft	feet	IDM	investigative-derived media	mm	millimeter
ft/ft	feet per foot	IDW	investigation-derived waste	MM	mounded material
FTA	Fire Training Area	ILCR	incremental lifetime cancer risk	MOGAS	motor vehicle gasoline
FTMC	Fort McClellan	IMPA	isopropylmethyl phosphonic acid	MPA	methyl phosphonic acid
FTRRA	FTMC Reuse & Redevelopment Authority	IMR	Iron Mountain Road	MR	molasses residue
g	gram	in.	inch	MS	matrix spike
G-856	Geometrics, Inc. G-856 magnetometer	Ing	ingestion	mS/cm	millisiemens per centimeter
G-858G	Geometrics, Inc. G-858G magnetic gradiometer	Inh	inhalation	MSD	matrix spike duplicate
gal	gallon	IP	ionization potential	MTBE	methyl tertiary butyl ether
gal/min	gallons per minute	IPS	International Pipe Standard	msl	mean sea level
GB	sarin	IRDMIS	Installation Restoration Data Management Information System	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
gc	clay gravels; gravel-sand-clay mixtures	ISCP	Installation Spill Contingency Plan	mV	millivolts
GC	gas chromatograph	IT	IT Corporation	MW	monitoring well
GC/MS	gas chromatograph/mass spectrometer	ITEMS	IT Environmental Management System TM	NA	not applicable; not available
GCR	geosynthetic clay liner	‘J’	estimated concentration	NAD	North American Datum
GFAA	graphite furnace atomic absorption	JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	NAD83	North American Datum of 1983
GIS	Geographic Information System	JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	NAVD88	North American Vertical Datum of 1988
gm	silty gravels; gravel-sand-silt mixtures	JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	NCP	National Contingency Plan
gp	poorly graded gravels; gravel-sand mixtures	JPA	Joint Powers Authority	ND	not detected
gpm	gallons per minute	K	conductivity	NE	no evidence; northeast
GPR	ground-penetrating radar	L	lewisite; liter	ne	not evaluated
GPS	global positioning system	LC ₅₀	lethal concentration for 50 percent of population tested	NFA	No Further Action
GS	ground scar	LD ₅₀	lethal dose for 50 percent of population tested	ng/L	nanograms per liter
GSA	General Services Administration; Geologic Survey of Alabama	l	liter	NGVD	National Geodetic Vertical Datum
GSBP	Ground Scar Boiler Plant	LCS	laboratory control sample	NIC	notice of intended change
GSSI	Geophysical Survey Systems, Inc.	LEL	lower explosive limit	NIOSH	National Institute for Occupational Safety and Health
GST	ground stain	LOAEL	lowest-observed-advserse-effects-level	NPDES	National Pollutant Discharge Elimination System
GW	groundwater	LT	less than the certified reporting limit	No.	number
gw	well-graded gravels; gravel-sand mixtures	LUC	land-use control	NOAA	National Oceanic and Atmospheric Administration
HA	hand auger	LUCAP	land-use control assurance plan	NOAEL	no-observed-adverse-effects-level
HCl	hydrochloric acid	LUCIP	land-use control implementation plan	NR	not requested; not recorded
HD	distilled mustard	max	maximum	ns	nanosecond
HDPE	high-density polyethylene	MCL	maximum contaminant level	N-S	north to south
Herb.	herbicides	MDC	maximum detected concentration	NS	not surveyed
HNO ₃	nitric acid	MDL	method detection limit	nT	nanotesla
hr	hour	mg/kg	milligrams per kilogram	NTU	nephelometric turbidity unit
H&S	health and safety	mg/L	milligrams per liter	nv	not validated
HSA	hollow-stem auger	mg/m ³	milligrams per cubic meter	O&G	oil and grease
HTRW	hazardous, toxic, and radioactive waste	mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	O&M	operating and maintenance
‘I’	out of control, data rejected due to low recovery	MHz	megahertz	OD	outside diameter
ICAL	initial calibration	µg/g	micrograms per gram	OE	ordnance and explosives
ICB	initial calibration blank	µg/kg	micrograms per kilogram	oh	organic clays of medium to high plasticity
ICP	inductively-coupled plasma	µg/L	micrograms per liter	ol	organic silts and organic silty clays of low plasticity
ICRP	International Commission on Radiological Protection	µmhos/cm	micromhos per centimeter	OP	organophosphorus
ICS	interference check sample	min	minimum	ORP	oxidation-reduction potential

List of Abbreviations and Acronyms (Continued)

OSHA	Occupational Safety and Health Administration	RPD	relative percent difference	TB	trip blank
OWS	oil/water separator	RRF	relative response factor	TCA	trichloroethane
oz	ounce	RSD	relative standard deviation	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
PA	preliminary assessment	RTK	real-time kinematic	TCDF	tetrachlorodibenzofurans
PAH	polynuclear aromatic hydrocarbon	SAD	South Atlantic Division	TCE	trichloroethene
Parsons	Parsons Engineering Science, Inc.	SAE	Society of Automotive Engineers	TCL	target compound list
Pb	lead	SAIC	Science Applications International Corporation	TCLP	toxicity characteristic leaching procedure
PCB	polychlorinated biphenyl	SAP	installation-wide sampling and analysis plan	TDGCL	thiodiglycol
PCE	perchloroethene	sc	clayey sands; sand-clay mixtures	TDGCLA	thiodiglycol chloroacetic acid
PCP	pentachlorophenol	Sch.	schedule	TERC	Total Environmental Restoration Contract
PDS	Personnel Decontamination Station	SD	sediment	TIC	tentatively identified compound
PEL	permissible exposure limit	SDG	sample delivery group	TLV	threshold limit value
Pest.	pesticides	SDZ	safe distance zone; surface danger zone	TN	Tennessee
PFT	portable flamethrower	SEMS	Southern Environmental Management & Specialties, Inc.	TOC	top of casing; total organic carbon
PG	professional geologist	SFSP	site-specific field sampling plan	TPH	total petroleum hydrocarbons
PID	photoionization detector	SGF	standard grade fuels	TRADOC	U.S. Army Training and Doctrine Command
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes	SHP	installation-wide safety and health plan	TRPH	total recoverable petroleum hydrocarbons
POL	petroleum, oils, and lubricants	SI	site investigation	TWA	time-weighted average
PP	peristaltic pump	SL	standing liquid	UCL	upper confidence limit
ppb	parts per billion	SLERA	screening-level ecological risk assessment	UCR	upper certified range
PPE	personal protective equipment	sm	silty sands; sand-silt mixtures	‘U’	not detected above reporting limit
ppm	parts per million	SM	Serratia marcescens	USACE	U.S. Army Corps of Engineers
PPMP	Print Plant Motor Pool	SOP	standard operating procedure	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
ppt	parts per thousand	sp	poorly graded sands; gravelly sands	USAEC	U.S. Army Environmental Center
PRG	preliminary remediation goal	SP	submersible pump	USAEHA	U.S. Army Environmental Hygiene Agency
PSSC	potential site-specific chemical	Sr-90	strontium-90	USACMLS	U.S. Army Chemical School
pt	peat or other highly organic silts	SRA	streamlined human health risk assessment	USAMPS	U.S. Army Military Police School
PVC	polyvinyl chloride	Ss	stony rough land, sandstone series	USATEU	U.S. Army Technical Escort Unit
QA	quality assurance	SS	surface soil	USATHAMA	U.S. Army Toxic and Hazardous Material Agency
QA/QC	quality assurance/quality control	SSC	site-specific chemical	USCS	Unified Soil Classification System
QAP	installation-wide quality assurance plan	SSHO	site safety and health officer	USDA	U.S. Department of Agriculture
QC	quality control	SSHP	site-specific safety and health plan	USEPA	U.S. Environmental Protection Agency
QST	QST Environmental, Inc.	SSL	soil screening level	USGS	U.S. Geological Survey
qty	quantity	SSSL	site-specific screening level	UST	underground storage tank
Qual	qualifier	SSSSL	site-specific soil screening level	UTL	upper tolerance level
‘R’	rejected data; resample	STB	supertropical bleach	UXO	unexploded ordnance
RAO	removal action objective	STC	source term concentrations	VOA	volatile organic analyte
RBC	risk-based concentration	STEL	short-term exposure limit	VOC	volatile organic compound
RCRA	Resource Conservation and Recovery Act	STOLS	Surface Towed Ordnance Locator System®	VOH	volatile organic hydrocarbon
RDX	cyclonite	Std. units	standard units	VQlfr	validation qualifier
RfD	reference dose	SU	standard unit	VQual	validation qualifier
ReB3	Rarden silty clay loams	SVOC	semivolatile organic compound	VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
REG	regular field sample	SW	surface water	Weston	Roy F. Weston, Inc.
REL	recommended exposure limit	SW-846	U.S. EPA’s <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>	WP	installation-wide work plan
RFA	request for analysis	SWPP	storm water pollution prevention plan	WS	watershed
RGO	remedial goal option	SZ	support zone	WSA	Watershed Screening Assessment
RI	remedial investigation	TAL	target analyte list	WWI	World War I
RL	reporting limit	TAT	turn around time	WWII	World War II

List of Abbreviations and Acronyms (Continued)

XRF x-ray fluorescence
yd³ cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected